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200 MM (8 IN) FLEXIBLE DISK CARTRIDGE TRACK FORMAT USING MODIFIED FREQUENCY MODULATION RECORDING AT 13262 BPRAD ON TWO SIDES - 1.9 TPMM (48 TPI) FOR INFORMATION INTERCHANGE

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U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, Secretary
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, Director

Foreword

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James H. Burrows, Director
Institute for Computer Sciences and Technology

Abstract

This standard prescribes a set of physical track format specifications for two-sided, double-density, 200 mm (8 in) flexible disk cartridges which have a data density of 13262 bits per radian (bprad) and 77 tracks at a track density of 1.9 tracks per millimeter (tpmm) (48 tracks per inch (tpi)). Citing these specifications will help to ensure that interchange parties can reliably interchange data files between information processing systems.

Key words: Computers; computer system hardware; data interchange; data processing; data processing equipment; flexible disk cartridges; information systems; magnetic recording; standards.

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**Federal Information
Processing Standards Publication 115**

1985 September 30

Announcing the Standard for



**200 mm (8 in) Flexible Disk Cartridge Track Format
Using Modified Frequency Modulation Recording at 13262 bprad on
Two Sides - 1.9 tpmm (48 tpi) for Information Interchange**

Federal Information Processing Standards Publications are issued by the National Bureau of Standards pursuant to section 111(f)(2) of the Federal Property and Administrative Services Act of 1949, as amended, Public Law 89-306 (79 Stat. 1127), Executive Order 11717 (38 FR 12315, dated May 11, 1973) and Part 6 of Title 15 Code of Federal Regulations (CFR).

Name of Standard. 200 mm (8 in) Flexible Disk Cartridge Track Format Using Modified Frequency Modulation Recording at 13262 bprad on Two Sides - 1.9 tpmm (48 tpi) for Information Interchange (FIPS PUB 115).

Category of Standard. Hardware, Interchange Codes and Media.

Explanation. This standard prescribes a set of physical track format specifications for two-sided, double-density, 200 mm (8 in) flexible disk cartridges which have a data density of 13262 bits per radian (bprad) and 77 tracks at a track density of 1.9 tracks per millimeter (tpmm) (48 tracks per inch (tpi)). Citing these specifications will help to ensure that interchange parties can reliably interchange data files between information processing systems.

In order to ensure interchangeability of data between information processing systems by use of a physically removable medium, three distinct levels of compatibility specifications are necessary:

- 1) specifications for the unrecorded interchange medium (e.g., the flexible disk cartridge),
- 2) specifications for the physical track format (the specifications in this document),
- 3) specifications for the logical track format (FIPS PUB 118).

Interchange of text, rather than data files, requires other specifications in addition to the above three levels.

The track format specifications contained in this standard are only for one type of flexible disk cartridge recording technology. Other Federal Information Processing Standards Publications (FIPS PUBS) specify physical track formats for other major types of flexible disk cartridge recording technology and labelling and file structure (logical track format) specifications for use with all types of flexible disk cartridges.

This family of specifications was developed through the international voluntary industry standards process. In this process, the American National Standards Institute (ANSI) represents the United States. The National Bureau of Standards (Institute for Computer Sciences and Technology) has provided the international representative, whose job has been to focus and coordinate U.S. interests for ANSI during the development of these physical track format standards.

Maintenance Agency. Department of Commerce, National Bureau of Standards (Institute for Computer Sciences and Technology).

Cross Index. International Organization for Standardization (ISO) 7065/2, Data Interchange on 200 mm (8 in) Flexible Disk Cartridges Using Modified Frequency Modulation Recording at 13 262 ftprad, 1,9 tpmm (48 tpi), on Both Sides - Part 2: Track Format.

Related Documents.

a. American National Standard Code for Information Interchange, X3.4-1977, FIPS PUB 1-2.

b. American National Standard Code Extension Techniques for Use with the 7-Bit Coded Character Set of American National Standard Code for Information Interchange, X3.41-1974, FIPS PUB 1-2.

c. American National Standard Additional Controls for Use with American Standard Code for Information Interchange, X3.64-1979, FIPS PUB 86.

d. American National Standard for Information Systems - Two-Sided, Unformatted, 8-in (200-mm), 48-tpi, Double-Density, Flexible Disk Cartridge-General, Physical, and Magnetic Requirements for 13262 ftpr Two-Headed Application, X3.121-1984.

Applicability. This standard is applicable to the acquisition and use of all recording and reproducing equipment employing 200 mm (8 in) flexible disk cartridges with the following characteristics: modified frequency modulation recording at 13262 bprad on two sides, and 77 tracks at a track density of 1.9 tpmm (48 tpi). Federal information processing systems employing such equipment, including associated software, should provide the capability to accept and generate recorded flexible disk cartridges in compliance with the requirements set forth in this standard. This standard should be used for the

interchange of flexible disk cartridges unless the interchange parties can agree upon an alternate interchange format which is more efficient, convenient, and cost effective.

Specifications. This standard incorporates by reference (with qualifications as noted) the technical specifications of ISO 7065/2, Data Interchange on 200 mm (8 in) Flexible Disk Cartridges Using Modified Frequency Modulation Recording at 13 262 ftprad, 1,9 tpmm (48 tpi), on Both Sides - Part 2: Track Format.

Qualifications.

a. ISO 7065/2 specifies the use of ISO 646, ISO 2022, and ISO 4873. For the purposes of this standard, American National Standard Code for Information Interchange, X3.4-1977 (defined in FIPS PUB 1-2), American National Standard Code Extension Techniques for Use with the 7-Bit Coded Character Set of American National Standard Code for Information Interchange, X3.41-1974 (defined in FIPS PUB 1-2), and American National Standard Additional Controls for Use with American Standard Code for Information Interchange, X3.64-1979 (defined in FIPS PUB 86) replace all references to ISO 646, 2022, and 4873.

b. The following additional qualifications are to be applied to ISO 7065/2:

1. Delete section 2, Conformance.

2. Replace section 4.8, Sector, with the following section:

4.8 Sector

All tracks of the flexible disk cartridge shall be divided into 26 sectors.

3. Replace section 4.11, Data Capacity of a Track, with the following section:

4.11 Data Capacity of a Track

The data capacity of track 00, side 0 shall be 3328 bytes. The data capacity of all other tracks shall be 6656 bytes.

4. In section 6, Track Layout after the First Formatting for all Tracks Excluding Track 00, Side 0, the first sentence and the note are deleted.

5. In section 6.2.2.1, Track Address, add the following sentence under the subheading "Cylinder Address (C):" All cylinders shall be recorded in the natural order (i.e., 00, 01, 02, . . . , 75, 76).

6. In section 6.2.2.1, Track Address, add the following sentence under the subheading "Side Number (Side):" The sides shall be recorded in the natural order (i.e, 00, 01).

7. Replace section 6.2.2.2, Sector Number (S), with the following section:

6.2.2.2 Sector Number (S)

The third byte shall specify in binary notation the sector number from 01 for the first sector to 26 for the last sector.

The sectors shall be recorded in the natural order (i.e., 01, 02, 03, . . . , 25, 26).

8. Replace section 6.2.2.3, Sector Length (SL), with the following section:

6.2.2.3 Sector Length (SL)

This field shall be (01) which defines the number of bytes of the data field to be 256 and consequently determines the number of sectors of the track to be 26.

9. Replace section 6.5, Data Block Gap, with the following section:

6.5 Data Block Gap

This field shall comprise 54 initially recorded (4E)-bytes. It is recorded after each data block and it precedes the following Sector Identifier. After the last Data Block, it precedes the Track Gap.

10. Replace section 6.6, Track Gap, with the following section:

6.6 Track Gap

This field shall follow the Data Block Gap of the last sector. It shall comprise 598 initially recorded (4E) bytes. Writing of the Track Gap takes place until the Index Hole is detected, unless it has been detected during writing of the last Data Block Gap, in which case there will be no Track Gap.

11. Replace section 4.2, Track Location Tolerance of the Recorded Flexible Disk Cartridge, with the following section:

4.2 Track Location Tolerance of the Recorded Flexible Disk Cartridge

The centerlines of the recorded tracks shall be within ± 0.085 mm (0.0033 in) of the nominal positions, when measured in the testing environment described in this section.

The testing environment shall consist of the following conditions:

temperature: $23 \pm 2^{\circ}\text{C}$ ($73 \pm 4^{\circ}\text{F}$)

relative humidity (RH): 40 to 60%

conditioning before testing: 24 hours minimum.

The temperature and the RH shall be measured in the air immediately surrounding the cartridge. The ambient stray magnetic field shall not exceed 4000 A/m (50 Oe).

12. Replace all occurrences of "Sector Address" with "Address Identifier."

13. In section 6.2.2.1, Cylinder Address (C), replace 76 with 74.

14. In section 7.4.2.2.1, Cylinder Address (C), replace 76 with 74.

Implementation Schedule. This standard becomes effective April 1, 1986. Use by Federal agencies is strongly recommended when such use contributes to operational benefits, efficiency, or economy.

Special Information. Each agency has the responsibility for the procurement of unrecorded, two-sided, double-density, 200 mm (8 in) flexible disk cartridges for use with this standard. American National Standard for Information Systems - Two-Sided, Unformatted, 8-in (200-mm), 48 tpi, Double-Density, Flexible Disk Cartridge-General, Physical, and Magnetic Requirements for 13262 ftpr Two-Headed Application, X3.121-1984, may be cited in agency procurements. While X3.121-1984 is not intended to be sufficient by itself as a procurement specification document, it can serve as an important basis for specifying compatibility. Each agency can also utilize the General Services Administration multiple award schedule for flexible disk cartridges (FSC GROUP 70 PART I SECTION B Class 7045-0001).

Where to Obtain Copies. Copies of this publication are for sale by the National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia 22161. (Sale of the included specifications document is by arrangement with the American National Standards Institute.) When ordering, refer to Federal Information Processing Standards Publication 115 (FIPS PUB 115), and title. Payment may be made by check, money order, purchase order, credit card, or deposit account.



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